Building Research Capacity and Infrastructure

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The last seven to ten years have been very challenging for universities: we have seen a growing scarcity of resources for research due to decreases in federal funding and reductions in state support. At the same time, research administrative costs have been increasing, as greater resources (including staff time) are required to handle the growth in compliance, accountability and reporting requirements. Greater investments are needed to maintain, let alone grow funding streams in these uncertain times and the administration of research has become more complex. Public support for higher education institutions is on the decline, and universities are expected to demonstrate their relevance in terms of their abilities to solve complex societal problems.

During this time, Iowa State University (ISU) witnessed a period of rapid growth in its external funding; during a period of 5 years (2008 – 2011), sponsored funding increased from $274 million to $365 million (after peaking at $385 million during the ARRA funding years). Prior to this period, from 2005-2008, sponsored funding had been decreasing and so the university made some deliberate and calculated decisions that helped not only reverse the downward trend but increase the level of funding to unprecedented levels. Although ISU's approach was neither new nor unique, it is nonetheless worth recounting some of these strategies since it underlines the importance of institutional investments in research administration and infrastructure (broadly defined), without which, research capacity cannot be built and research advancement cannot take place.

Despite severe cuts in state funding over a 3 year period, ISU was able to make critical investments, develop new programs, and improve processes and overall efficiencies. Some of these efforts are described below:

1. Institutional strategic investments were made in a few critical areas: bio-economy, vaccine development and delivery, integrated health, and HPC. Criteria for identifying these strategic priorities included (i) the existing base or at least, pockets of excellence, in the proposed area that included a critical mass of researchers with senior faculty leadership; (ii) the theme/area would address scientific/economic/social challenges that required broad-based interdisciplinary approach; (iii) there were clearly defined focus areas within the themes where ISU was seen as capable of providing leadership and setting the research agenda and/or had collaborative networks

with other institutions that were recognized as world leaders in that area.

2. New faculty hires (cluster hires); these were inter-departmental and inter-college hires with the objective of developing interdisciplinary expertise. It was also meant to reinforce a culture of collaboration by sending a clear message that the university supports and values interdisciplinary research. Many of these cluster hires were at the entry level (assistant professors) and very few at senior positions mainly due to financial reasons. These junior hires were paired with senior faculty who are known for their collaborative work in order to provide them with the mentoring in cross disciplinary work.

3. A strong commitment to provide excellent research support services and facilities that are needed to enable research excellence and knowledge transfer. These include sponsored program accounting and administration; responsible research and compliance; core facilities and laboratories. The former and current VPRs held 'listening sessions' that helped us identify the impediments and challenges that researchers faced with respect to any aspect of research administration and plans to address the issues/obstacles have been in progress. Most notably, the VPR Office has stepped up the resources available to help faculty submit grant proposals and manage awards by offering comprehensive menu of research development and support services chain (identify funding opportunities; proposal preparation and submission;

project management and compliance; reporting and closeout), thereby making it easy for faculty to develop, prepare, and submit grant proposals by reducing administrative or clerical work. The VPR Office and the Office for Sponsored Programs Administration also provided several training and workshops for support staff in departments and centers to upgrade their skills in grant preparation and post-award and project management.

4. Develop the capacity and capability to deal with the growth of compliance requirements' complexity and intensity. The VPR Office has been helping create a culture that promotes compliance, research integrity and ethical conduct by incorporating awareness at all levels. There has also been greater efforts to help researchers and staff understand and deal with these requirements and at the same time, develop efficient and proportionate processes to meet compliance and reporting requirements so that they do not become unduly burdensome for researchers.

5. A broad plethora of professional development programs for all researchers – faculty, staff, postdocs and graduate students – are offered each year to help early career researchers gain grantsmanship and research administration related skills. In addition, and in collaboration with the Provost Office, new mentoring programs were developed that were based on a 'distributed model' that involved department chairs and senior faculty. The goal was to allow faculty at every stage of their career, and

in all disciplines, to flourish and develop. The creation of a grants office to assist arts and humanities faculty obtain external funding is perhaps most noteworthy. This office helps identify funding opportunities for specific projects, assists faculty members with proposal development and submission, and trains them to become eventually self-sufficient. The VPR Office uses the limited submission internal competition to provide targeted support and maximize the chances of success (example, internal peer reviews of grant proposals and manuscripts, assistance with proposal coordination for large grants, and sharing of best practices from previous successful grant proposals).

6. Although most cross-disciplinary interaction occurs spontaneously, the VPR Office proactively facilitated team formation by providing thematic contexts for cross-disciplinary interaction based in large part on emerging new opportunities. These efforts helped develop multidisciplinary communities that were well-equipped to address problems demanding diverse expertise. This was also a time when the President and Provost Offices were willing to invest their own resources to foster an environment where openness to cross-disciplinary interaction was recognized and rewarded through campus-wide discussions on tenure and promotion criteria.

7. In an effort to build interdisciplinary research capacity, a seed fund program was re-introduced. The im-

portance of investments in developing new or 'tuning up' existing research programs cannot be overstated. The VPRED Office used to have a modest budget for seed grants, but it was lost during the budget cuts. Using some limited amount of funds, a new and revised seed grant program was introduced that extended beyond the traditional planning grants and/or pilot projects from yesteryears. The primary goal of these new seed grants was to build new cross-disciplinary research themes. Some of the colleges offered their own 'venture capital' funding to build large inter-disciplinary teams. After surviving three years of severe state budget cuts, the VPR Office began to offer funds to meet other needs such as (i) seed funding to gather pilot data for NIH grants, (ii) graduate student funding – especially to support training grants – and required co-supervision from faculty in different colleges; (iii) build collaborations with industry partners (both contribute for a pre-commercialization phase); (iv) small grants for junior faculty teams -- junior faculty partner with junior faculty in another discipline and have a senior faculty as mentor; and (v) modest funds for inter-disciplinary seminar programs, conferences and workshops.

8. A deliberate strategy was adopted to broaden our funding sources and target specific programs within traditional funding agencies that had been beyond our reach until that point. In particular, the focus was on large center grants were targeted and ISU was

awarded 7 large center grants during this period.

9. By partnering with other units, the VPR Office helped expand ISU's engagement with industry through an integrated team approach, making it easier for companies to work with ISU as well as for researchers to communicate their expertise and interests to industry. At this time, there was strong institutional support from the top to these efforts, which demonstrated a commitment of the university leadership to corporate relations. ISU created an 'industry relations team' by bringing together professional staff who were distributed in different offices across campus (in subsequent years, additional staff were added to this team). This team's goal was to work with internal and external partners to build corporate engagement (overcome barriers); provide one point of contact for the corporation, build awareness of university programs and strengths, identify each company's strategic needs and match those needs with the university's strengths and strategic priorities, and generate new leads and prospects. Specifically, the industry relations team was expected to gain knowledge about faculty strengths and research capabilities in specific areas that would be of interest to targeted industries (example, aerospace, biofuels, food, agro-based, pharmaceuticals) and communicate those strengths to corporate partners. Once an area of mutual interest is established, the team was expected to close the deal by working with appropriate offices to develop contracts and agreements in a timely manner. They would also help with the stewardship of the projects: correspondence, annual reports, site visits focused on showcasing the work done and recognition/appreciation to promote the collaborations.

10. The VPR Office helped provide leadership in building strategic alliances regionally and nationally -- with other universities, national laboratories, and industry. With each partner, we identified prospects where strengths are complementary and synergistic and where combined effort offers exceptional potential. While many of these collaborations were driven by partnering needs for large center-based solicitations, others were deliberately cultivated to develop broad-based engagement (as with industry) or to enable sharing of key infrastructure and equipment that made it easier for ISU to compete for equipment grants.

11. Last, but not least, and especially now under the new VPR, there is a strong commitment that all support service units under the VPR Office will be well managed, service-oriented, and responsive to faculty needs. Staffing for many of the critical research support offices such as sponsored programs administration and responsible research has increased, making it easier for these units to keep up with the growth in the volume and complexity of sponsored funding contracts. There are resources now for staff professional development and a

cultural shift that emphasizes consultative decision making, and continuous self-assessment and improvement.

CONCLUSION

The VPR Office played a proactive role in anticipating emerging themes and areas for new funding, in building capacity, and developing a research portfolio that capitalized on ISU's position of leadership in targeted areas. Even during periods of budget cuts, the university identified institutional resources that were flexible and deployable for capacity-building in areas of emergent research excellence. By building on existing strengths, and working across and between disciplines, ISU was able to see growth in external funding from a range of sources across the breadth of the university's research activity. A few lessons are noteworthy: (1) it is critical that research universities develop a plan to diversify their funding portfolio to hedge against the vagaries of external funding; (2) make selective, strategic investments even in difficult times; (3) develop long-term sustainable plans for programs and units; (4) although it may be politically unpopular to do so, discontinue support for unproductive and under-used programs and units; and (5) be willing to take some calculated risks.